

B. J. Mead

a binder.--

REMARKS

Claims 1-15 have been rejected and have been re-written as claims 16 to 35. Claims 1-15 have been rejected on asserted 102 and 103 prior art grounds. Claims 2, 4, 9, and 10 are rejected on asserted 112 first paragraph grounds. All claims are rejected on asserted 112 second paragraph grounds. In response, applicants provide amended claims as claims 16 to 35 to meet rejections and suggestions by the Examiner.

Claim 16 has been re-written from claim 1.

The term "crosslinking" in claim 17 is supported for example on page 6, line 15. Adjusting nitrogen content by crosslinking and hydrolysis is described for example in the bottom half of page 7 and the last 8 lines of page 8.

The term 1.0 to 4.5 meq/g in claims 18, 28 and 31 is supported for example on page 8 lines 22-23.

The list of crosslinkers in claim 19 is supported for example on page 8 lines 11 to 17.

The term "1 % to 10% by weight nitrogen content" in claims 20, 29 and 32 is supported for example on page 7 lines 19 to 20.

Claims 21 to 25, 27 30, and 33 to 35 contain terms in the originally filed claims.

The alternative materials listed in claim 26 having heat releasing/water absorption properties are supported for example on page 6 lines 7 to 19.

No new matter has been added in the new claims.

Reconsideration and allowance earnestly is requested.

Objections, 25 USC 112 (1st)

Item 1. As suggested by the Examiner, the term "characterized in comprising" has been removed in the new claims.

Objections - 35 USC 112

Item 2. The Examiner has asserted at the bottom of page 2 from the office action that "polyacrylate-series fibers are not enabled by the specification" and that "the Specification on p. 6 discloses polyacrylonitrile-series fibers and crosslinked acrylic fibers which are not equivalent to polyacrylate-series fibers."

In response, applicants point out that the "polyacrylonitrile-series polymer containing 40% by weight or more, preferably 50% by weight or more, of acrylonitrile (hereinafter mentioned as AN) " is a "starting fiber" (emphasis added) and not the intended product for this embodiment of the invention. The described polyacrylonitrile starting fiber is processed into a final product acrylate fiber as taught in the specification, for example in pages 7 through 9 (emphasis added). More specifically, the specification teaches "introducing a hydrazine compound, as a crosslinking agent, into the above acrylic fibers" (page 7 lines 15-17). Applicants have provided a great amount of enabling detail for this embodiment and have suggested ranges of nitrogen contents and reaction conditions (page 7 lines 18 to page 8 line 7), as well as examples of suggested hydrazine compounds and other amine containing compounds (page 8 lines 11 to 17).

Importantly, the specification on page 8 lines 19 to page 9 line 8 teaches how crosslinking may convert a representative polyacrylonitrile-series polymer to a polyacrylate series fiber. Namely "hydrolysis" is used to "substantially" (line 1) remove "the nitrile groups remaining uncrosslinked after the crosslinking treatment with a hydrazine compound, and introducing 1.0 to 4.5 meq/g of salt type carboxyl groups and

amido groups into the remaining parts." The exemplified conditions cover a wide range and the "hydrolysis (to convert into polyacrylate) may be carried out at the same time as the introduction of the above crosslinking agent.

Without wishing to be bound by any one theory for how this embodiment of the invention works, it is thought that the hydrolysis and introduction of carboxyl groups gives the material the special heat releasing (while absorbing moisture) characteristics. Indeed, the inventors speculate that the "final product" made by the exemplified reaction taught on pages 8 to 9 has many introduced locations for van der Waals binding of water molecules, that release heat upon binding. Another possible explanation is that the carboxylic acids provide binding sites that release heat. In any event, the specification teaches how to convert a polyacrylonitrile polymer to a polyacrylate series with a very special characteristic that provides a very unusual fabric that provides heat while it gets wet. This is a very unusual yet very desirable feature in a windproof garment designed to be worn in cold climates, for example during skiing.

New claims 31 to 35 now more specifically recite this particularly advantageous material as formed by the cited reaction.

These representative sections of the specification teach how polyacrylonitrile series polymer may be converted into a wide range of polyacrylate series fiber under a wide range of conditions. The latter fiber product is intended for embodiments of the invention, not the starting fiber. A skilled artisan reading this specification easily can follow these instructions to prepare unspecified fiber containing carboxyl (and amido) groups, and which has desirable properties.

Because representative conditions for converting polyacrylonitrile to polyacrylate are described as explained above, the Examiner respectfully is requested to withdraw this rejection.

Items 3, 4, 5. The Examiner rejected claims 1, 2, 6 and 8 with respect to air layer density language. This language has been changed to "at least 50 ml of air per gram of

mass" (claim 16). Reconsideration and allowance are requested.

Item 6. The Examiner rejected claim 2 for referring to a "heat retaining fiber" as feather. New claim 21 recites this term. The term "fiber" is meant and used in its broad sense as in "food and fiber." This broad definition is supported by the American Heritage Dictionary of the English Language (Third Edition), which states as one definition "Something that provides substance or texture." Claim 2 also refers to such property and is supported on page 6 lines 7 to 19. Reconsideration and allowance are requested.

Item 7. The Examiner questioned whether the term "series" in claims 2, 4, 9 and 16 refers to a family of acrylic fibers in a most general sense. That is true and the term has this a field recognized meaning. Some of the new claims use this term in that sense. Reconsideration and allowance are requested.

Item 8. Claims 24 and 25 now utilize the term "both" to mean outer material and lining. Reconsideration and allowance are requested.

Item 9. The phrase "other desirable properties" is not present in the new claims. Reconsideration and allowance are requested.

Items 10 and 11. The term "inherent minimum moisture" and how to achieve it is described throughout the application,. For example, at the top of page 13 "the inherent minimum moisture content of the dried fiber indicates a moisture content in the fiber at which equilibrium is established by conducting hot-air drying for a specified time or longer, within a temperature range of not lower than 10 °C..." An example is given on page 13 lines 16 to 23, where a fiber reaches its inherent minimum moisture of 15% "and remains to be in equilibrium at the 15% moisture content, regardless of further

continuation of the drying."

Rejections - 35 USC 102/103

Items 12 to 14. Prior art rejection over GB2000440A (filler for quilts etc)

The new independent claim 16 recites a distinguishing property of "moisture-absorbing heat generating" material in the claim preamble and also in the claim body. The dependent claims further recite chemical crosslinking reactions used to~ prepare desirable fibers having this distinguishable property. Terms recited in a claim preamble and relied on in the body (and in this case, also in the body of dependant claims) are relied on for patentability. Thus, fiber having the recited property are claimed. The material used by GB2000440A does not have this property, either explicitly or inherently. Accordingly reconsideration and allowance are requested.

Items 15 to 17. Obviousness Rejection The new claims recite a property "moisture-absorbing heat generating" that is not found in the cited art. Claims 1 -20, 28, 29, 31 and 32 recite specific methodological features for producing representative fibers that produce heat upon wetting and claim 26 recited other suitable materials having the property. The cited references do not describe any suitable material, however, and therefore, a prima facie obviousness rejection does not exist. Reconsideration and allowance are requested.


Reconsideration and allowance are requested.

CONCLUSION

The application is in condition for allowance and the prompt issuance of a Notice of Allowance is respectfully requested. If there are any additional fees due with the filing of this Amendment, please charge any and all such fees to the undersigned's Deposit Account No. 08-1641.

Respectfully submitted,

Date: September 6, 2002



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